a horizontal direction. The axial relation $a : b : c = 1.1626 : 1 : 1.5320$. $\beta = 89° 40'$.

Thomsenolite. — This mineral occurs in far greater quantity than pachnolite. Its chemical composition, from analysis by J. Brandl, is $NaF . CaF_2 . AlF_3 . H_2O$. Heated in the closed tube, it decrepitates violently, giving off acid water. The axial relation $a : b : c = .9959 : 1 : 1.0887$. $\beta = 89° 37\frac{1}{2}'$. Besides the perfect basal cleavage with mother-of-pearl lustre, a second cleavage parallel to the prism was observed. The habit of the crystals is prismatic, the prism striated horizontally.

Ralstonite. — This mineral occurs crystallized in isometric octahedrons; and thus far its constituents have been determined by a qualitative analysis made on a very small quantity, and one imperfect analysis, showing it to be a fluoride of aluminium, magnesium, calcium, and sodium, with water. Carefully selected material, submitted to analysis by J. Brandl, gave the following: F (57.12) . Al (22.14) . Na (5.50) . Ca (1.53) . Mg (3.56) . H_2O (10) = 99.85, corresponding to the formula, $3 (Na_2MgCa) F_2 . 8 AlF_3 . 6 H_2O$. The mineral occurs intimately associated with the thomsenolite.

Chiolite. — This is a tetragonal mineral, resembling cryolite, occurring in the Ilmen Mountains, with axial relation $a : c = 1 : 1.0418$. It seldom occurs in well-developed crystals; and, when so, the crystals are small. Occasionally it is met with in snow-white clusters composed of an aggregate of minute crystals. The various older analyses of the mineral vary very considerably; and a new analysis, by J. Brandl, gives the following result: F (57.30) . Al (17.66) . Na (24.97) = 99.93, corresponding to the formula, $5 NaF . 3 AlF_3$.

Arksutite. — This mineral, which has for a long time been regarded as a distinct species, is shown to be based upon an incorrect analysis, and is probably nothing more than a mixture of cryolite with pachnolite.

Fluellite. — This mineral, which is one of the rarest, is known in the form of minute sharp rhombic pyramids, occurring with wavellite and other minerals from Cornwall. With great trouble .12 gram was obtained quite pure for analysis. This gave J. Brandl the following: F (56.25) . Al (27.62) . Na (0.56) [H_2O (15.55)] = 100. This agrees closely with the simple formula, $AlF_3 . H_2O$.

Prosopit. — This rare mineral, found at Altenberg, Saxony, but not since 1866, occurs mostly altered into kaolin, in some cases the crystals having a core of unaltered material within them, while a few are wholly unaltered. The crystals, while they have been converted into kaolin, have retained their form most perfectly. The crystals are monoclinic, with the axial relation $a : b : c = 1.318 : 1 : 0.5912$. $\beta = 86° 2'$. Pure material gave J. Brandl, upon analysis, F (35.01) . Al (23.37) . Ca (16.19) . Mg (0.11) . Na (0.33) . H_2O (12.41) . loss regarded as oxygen (12.58) = 100, corresponding to the formula, $CaAl_2 (F, OH)_8$, in which fluorine and hydroxyl are isomorphous.

S. L. PENFIELD.

COLOR AND ASSIMILATION.

A NEW method of measuring the effect of rays of different degrees of refrangibility upon the assimilative activity of vegetable cells has been recently devised by Th. W. Engelmann of Utrecht. It will be seen that the method is simple, and probably of wide applicability. It consists in the use of a few uninjured cells, — for instance, of some filamentous alga, — placed in water which contains bacteria. If oxygen is evolved from the cells, as in assimilation, the bacteria, which up to that time may have been quiescent, become extremely active, and the activity is greatest close to the assimilating cells. If light be now withdrawn, the supply of oxygen is soon exhausted, and the bacteria again become quiet, resuming their activity as soon as the slightest trace of free oxygen is accessible to them. By their presence it is possible to detect, according to Engelmann, the one trillionth of a milligram of oxygen.

Supposing a long filament of some alga is thus arranged under the microscope, and light passes through the slide, the character of the light is seen at once to have a very marked effect upon the movements of the bacteria. If the light has first been passed through a direct-vision spectroscope placed *under* the stage of the microscope, so that the filament lies in the length of the spectrum thus produced, the bacteria are seen to cluster immediately in certain parts of the spectrum, to the exclusion of the others; and the inference is not unfairly drawn, that they go where oxygen is most abundant. To the facts thus presented in an earlier paper, Engelmann adds, in the *Botanische zeitung* (Jan. 5 and 12, 1883), some curious observations regarding the assimilative power possessed by vegetable cells of different colors. In brief, his results are the following: only those cells which contain chlorophyll or its equivalent in the protoplasmic body have any power of evolving oxygen; a colorless cell, or one which has coloring-matter only in the cell-sap, cannot evolve oxygen under the influence of any rays of light. This has a direct bearing upon the so-called 'screen' theory of Pringsheim, according to which the pigment acts only as a screen to diminish the otherwise too intense effect of light. It may be stated that Pringsheim suggested, that, by passing through a thin layer of solution of chlorophyll-pigment, the light would be so tempered as to bring about assimilation in colorless protoplasm. Engelmann shows that this is not likely to happen under any conditions of screening.

Furthermore, in experimenting upon algae of different colors, he found that the assimilative activity is not in the same part of the spectrum for all cells. For instance: the greatest activity for red cells is in the green; for green cells, in the red; for bluish green, in the yellow; and, for yellowish brown, in the green and red; or, *in general, in the color that is almost or completely complementary to the color of the cell.* To state this in another form, it may be said that the rays of the spectrum which effect the work of assimilation are identical with those which are absorbed by the chlorophylline coloring-matter.

It may be added that a large number of Engelmann's experiments were made by the use of Edison's lamp. In *Pflüger's archiv* for Jan. 10, the same author has a paper on a bacterium which he has found to be extremely sensitive to light, and which has been named B. photometricum. There are a few points in that communication which are not wholly in harmony with the facts stated above; but, as they are of minor consequence, they may be passed over now without further mention. GEO. L. GOODALE.

LARVAL STAGES AND HABITS OF THE BEE-FLY HIRMONEURA.

NOTHING is yet known of the first larval stage of the bee-flies. I have expressed the belief that future observation would show that there is a parallel between the Meloids and the Bombyliids, in that the first or newly-hatched larva of the latter would differ from the clumsy, partially parasitic, full-grown larva,